

**Water mites from Ecuador I. A new genus of the family Anisitsiellidae KOENIKE, 1909 (Acari: Hydrachnellae) from a rain forest stream in the province of Esmeraldas**

by

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**Abstract**

*Rubicundula placibilis*, gen. nov. sp. nov. is described from an affluent of Rio Carolina (El Dorado, Prov. Esmeraldas). Diagnostic features of the new taxon are the laminar medial protrusions of first coxae covering the lateral margins of the gnathosomal bay, the elongated genital field with anteriorly pointed genital flaps, and the presence of more than 80 acetabula arranged on longitudinal stripes along the gonopore. Further characteristics of the new taxon are: Dorsal shield with a pair of lateral sutures anteriorly turned backwards and approximating the median line, lateral eyes fused with the ventral shield, fourth legs with well-developed claws. Due to the unique character set of the new taxon it is difficult to hypothesize its phylogenetical relationships with other genera of the family Anisitsiellidae.

**Keywords:** Acari, Hydrachnellae, Ecuador, Running water fauna, water mites.

**Resumo**

*Rubicundula placibilis*, nov. gen. nov. sp. é descrito de um afluente do Rio Carolina (El Dorado, Prov. Esmeraldas). Características diagnósticas do novo taxon são: As protusões laminares mediais dos primeiros coxais, cobrindo a margem lateral da baía gnathosomal, o campo genital alongado com asas genitais direcionadas anteriormente, e a presença de mais de 80 'acetabula' arranjados em estrias longitudinais ao longo do gonóporo. Outras características do novo taxon são: Placa dorsal com um par de suturas laterais, tornada para trás anteriormente e aproximando-se da linha mediana, olhos laterais fundidos com a placa ventral, o quatro par de pernas com unhas bem desenvolvidas. Devido ao conjunto destes caracteres únicos do novo taxon, é difícil hipotetizar as suas relações filogenéticas com outros gêneros da família.



## Introduction

Notwithstanding the availability of several important large-scale studies (COOK 1980, 1988, and the literature cited therein), our knowledge of the composition of the water mite fauna of the South American continent is still patchy, with only a few published data concerning Peru, Bolivia, and Ecuador. During two collecting trips in November/December 1992 and December 1994/January 1995, I verified (as far as possible) the absence of true water mites from the Galapagos archipelago (GERECKE et al. 1995) and produced a first inventory of this group in continental Ecuador. Collections were done in streams and rivers along a virtual transect from the Pacific coast across the Andean highlands to upper Amazonia, including an altitudinal range between 10 and 3500 m asl. The description and discussion of the new taxa found during this survey (studies on species from the family Limnesiidae and the superfamily Hydryphantoidea are in course) is a contribution to our understanding of the phylogeny of water mite diversity.

The following abbreviations are used: Cx-1 = coxae 1; H = height; L = length; II-L-3 = third segment of second leg; P-1 = first segment of palpus; W = width.

### *Rubicundula placibilis* gen nov., sp. nov.

Diagnosis of the genus and only known species: Characters of the family Anisitsiellidae sensu Cook 1974; dorsal shield with a pair of lateral suture lines anteriorly curved towards the median line; lateral eyes fused with the ventral shield; lateral margins of the gnathosomal bay covered by laminar medial protrusions of Cx-1; genital field elongated, with anteriorly pointed genital flaps; more than 80 acetabula on longitudinal stripes along the gonopore; IV-L with well-developed claws.

Typus generis: *Rubicundula placibilis* GERECKE, 1995

Holotype, female (only known specimen, temporarily in coll. Gerecke, Tübingen, deposition in a Natural History Museum provided); Esmeraldas, El Dorado, brook E railway bridge Rio Carolina, 500 m asl., XII-27-1994 leg. Gerecke. Mounted on slide, imbedded in Hoyer's fluid; gnathosoma isolated from idiosoma, one palp and one chelicera detached, dorsal and ventral shield separated.

### Description

Idiosoma L 630, W 495  $\mu$ m; dorsal shield (Fig. 1 B) entire, L 616  $\mu$ m, maximum W (440  $\mu$ m) in the caudal third; with 5 pairs of glandularia incorporated in the lateral margin and one pair of setae-bearing pori located medially from the anterior glandularia. On each side, medially from the glandularia a fine suture line separating a precipitous lateral area with apparently more dense porosity from the slightly convex central disk of the shield. Anteriorly, these two suture lines strongly curved and directed mediocaudally, approximating the median line and obliterated anteriorly from the level of the second pair of glandularia; membranous dorsal furrow finely striate, with 5 pairs of free-lying lyrifissures.

Ventral shield (Fig. 1 A) completely sclerotized, with fine porosity, the lateral eyes included in the anterior margin on the level of the insertions of I/II-L; frontal margin equally convex dorsally, but with a strong subrectangular medial protrusion surmounting the dorsal margin of the insertion of the gnathosoma. Cx-1 157  $\mu$ m wide between the distal tips, maximum W Cx-3 315  $\mu$ m, distance between insertions IV-L 375  $\mu$ m. A continuous semicircular apodeme of Cx-1 extending between the left and right I-L insertions and forming the caudal and caudolateral margins of the gnathosomal bay. In ventral view, this bay bordered by laminar medial protrusions of the surface of Cx-1 which originate on the level of the anterior tips of the genital flaps; their margins straight and diverging in an angle of about 50°, but converging in the basal fourth, and slightly concave in the distal fourth. Coxal setae conspicuously long, arranged as

given in Fig. 1 A; suture lines between Cx-1/2, -2/3 and -3/4 complete, but Cx-1+2+3 forming a compact morphological unit with irregular lateral margins that cover the dorsally-directed insertions of the respective legs. In the mediodistal angle of Cx-3, a not clearly interpretable structure possibly representing a glandular opening; Cx-4 with equally rounded mediocaudal, and with caudally concave, rostrally convex lateral margins; a fine channel originating from the medial edge of Cx-4 reaches the lateral margin of the genital field on the level of its maximum width. The inner contour line of the genital field, formed mainly by the fused medial margins of Cx-3+4, subovoid, anteriorly not exceeding the level of the medial ends of the suture Cx-2/3. However, the actual external genital organ (Fig. 1 A, 2 D; L 202, W 103  $\mu$ m) conspicuously overlapping the anterior margin of this opening: genital flaps pointed and extremely elongated anteriorly, reaching the proximal margin of Cx-1. Genital flaps with only five pairs of very fine hairs, placed on the medial margins; region of gonoporus bordered by a pair of narrow stripes bearing at least 40 very small acetabula each; acetabula rounded or ovoid, arranged in three groups placed one behind the other, probably indicating their origin by subdivision of the original three pairs of acetabula.

Excretory porus small, rhomboid without particular sclerotizations, at a distance of 175  $\mu$ m from the genital field, and 112  $\mu$ m from the caudal margin of idiosoma.

Legs robust, with few setae, no swimming hairs present; III-L particularly strong, completely lacking dorsal setae, with all distal setae of segments 2-5 concentrated near the ventral margin; all claws with fine dorsal clawlets, claws of III-L particularly strong, claws of IV-L accompanied by a strong dorsodistal seta.

Shape of gnathosoma and its appendages as given in Fig. 2 A-C; gnathosoma L 160  $\mu$ m, with short rostrum and well-developed dorsal and ventral proximal appendages; chelicera slender (total L 250, H 24  $\mu$ m), with fine, weakly-curved claw; palpus total L 306  $\mu$ m, dorsal L (L/H relation) of segments P-1 26  $\mu$ m (0.57); P-2 102  $\mu$ m (1.42); P-3 54  $\mu$ m (1.17); P-4 88  $\mu$ m (2.67); P-5 36  $\mu$ m (2.00). P-2 enlarged, subrectangular, with one blunt, subterminal ventral and 5 fine dorsal setae; P-3 with concave ventral and convex dorsal margins, bearing 4 setae on the medial and lateral surface; P-4 with maximum H at its base, bearing a fine pointed ventral process and two long hairs at about 25  $\mu$ m from the distal edge, distal margin surrounded by 4 fine and one slightly stronger hairs.

### Discussion

Among the genera of Anisitsiellidae, the new genus *Rubicundula* is similar to *Bandakia* THOR, 1913, *Utaxatax* HABEEB, 1964, *Sighthoriella* BESCH, 1964, and *Bharatonia* COOK, 1967 in the symplesiomorphic presence of well-developed claws on IV-L, but differs in the boat-shaped genital field, probably also the multiplication of acetabula (presently, the acetabular number of *Sighthoriella* cannot be verified with certainty - Cook 1974), the absence of unfused glandularia in the dorsal furrow, and the presence of curved suture lines on the dorsal shield. Furthermore, it differs from *Sighthoriella* in the more robust palp with less pronounced ventral tubercles on P-4 and the suture lines Cx-3/4 reaching the margin of the genital field, from *Bandakia* and *Utaxatax* in the absence of a longitudinal suture line across the Cx-3, and from *Bharatonia* in the presence of an entire, not bipartite dorsal shield.

The only further polyacetabulate genus in the family Anisitsiellidae is *Sighthoria* KOENIKE, 1907 (first described under the name of "*Amasis*" by NORDENSKIÖLD 1905). *Rubicundula* differs from *Sighthoria* in the following (apomorphic) character states: lamellar protrusions of Cx-1 covering the lateral margins of the gnathosomal bay; genital field elongated, boat-shaped and (consequently) number of acetabula twofold higher; excretory pore removed from the caudal margin of idiosoma. On the other hand, *Sighthoria* displays the following apomorphies: dorsal shield complicately sculptured, IV-L with swimming hairs, but lacking in claws. At present, it is impossible to decide if polyacetabulism is a synapomorphy of the two genera. Surely, this character has evolved many times independently in phylogenetically unrelated clades of water mites, and the numerous autapomorphies of the two genera indicate at least a long time of independent evolution. The presence of a lateral suture line on the dorsal shield of *Rubicundula* could be interpreted as a precursor stage of the complicated sculpturing in *Sighthoria*. However, similar suture lines are found also in unrelated genera such as *Navamamersides* COOK, 1967 and *Nilgiriopsis* COOK, 1967.



### Habitat

*Rubicundula placibilis* was taken by hand-netting the benthos of a second order brook in a rain forest area at 500 m asl. The water course is about 70 cm wide, its bed steeply inclined, formed by a series of cascades between rocks and overturned trees, nearly without lenitic areas. The substratum consists mainly of large stones and gravels with detritus, outcropping rocks and marcescent wood; neither macrophyte vegetation, nor mosses were found. Temperature 23.5°C, conductivity 24  $\mu$ S/cm. The surrounding terrestrial vegetation is disturbed by wood harvesting, but the whole area is still completely shaded by forest vegetation. The collecting site is reached walking down the first brook E from the railway bridge crossing Rio Carolina.

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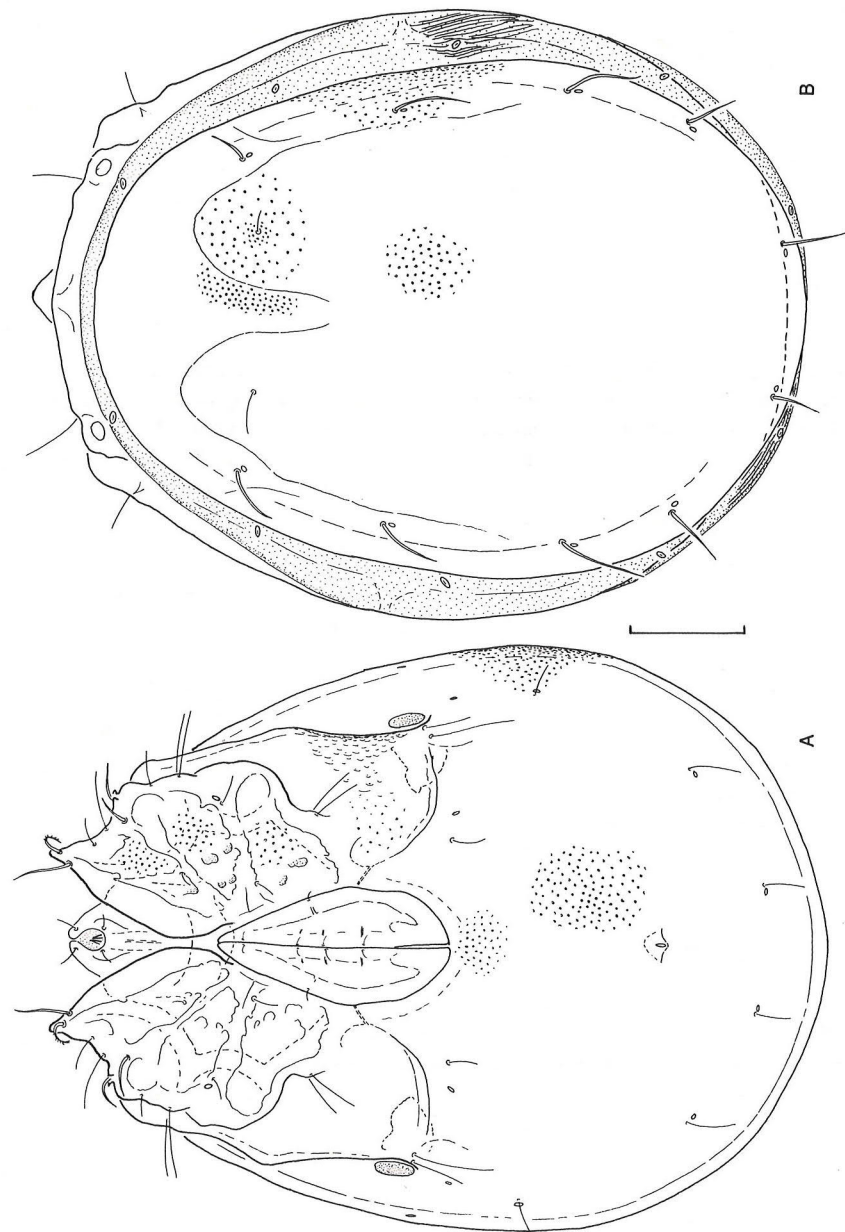


Fig. 1:  
*Rubicundula placibilis*, Idiosoma. A - ventral shield, B - dorsal shield. Bar =  $\mu$ m.

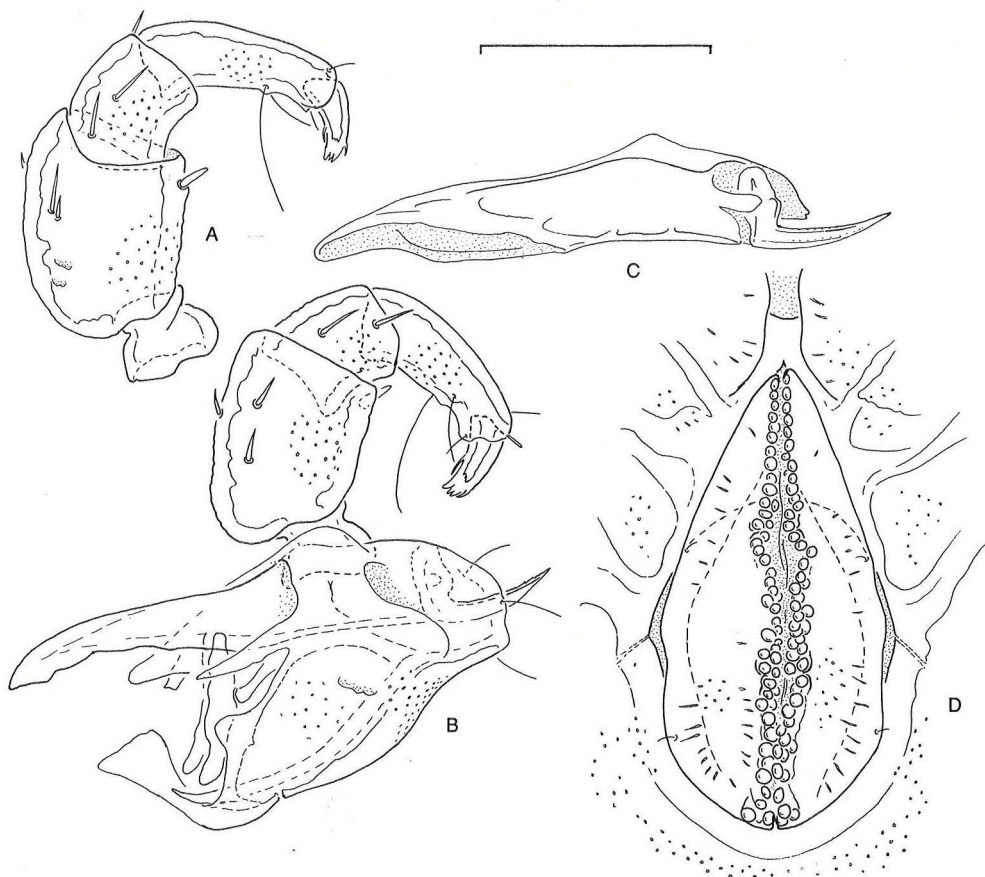


Fig. 2:

*Rubicundula placibilis*.

**A** - Right palp laterally, **B** - Gnathosoma with one chelicera and left palp medially, **C** - Chelicera,

**D** - Genital field (medial margins of genital flaps omitted in order to demonstrate the acetabula).

Bar = 100  $\mu$ m.